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ABSTRACT

This study examined the relation between teacher suspicion of attention deficit hyperactivity disorder (ADHD) and teacher ratings on common behavior measures used to identify and diagnose ADHD. The children, urban, Midwestern, African-American first graders, (N=372) completed the Conners' Continuous Performance Test (CPT), an objective measure of attention. They were also evaluated for ADHD symptomatology by both a teacher and a primary caretaker using the Child Behavior Checklist and the Teacher Report Form and the Conners' Parent and Teacher Rating Scales. Teachers suspected 97 of the 372 children (26.1 percent) of ADHD. Results indicate that children suspected of ADHD by their teachers had significantly higher behavior ratings as measured by both teachers and primary caretakers. However, the CPT did not tend to support the teacher or caretaker ratings of attention problems or impulsivity. (Contains 10 references.) (DB)

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Comparison of Teacher Suspicion of ADHD to Teacher, Primary Caretaker, and Blinded Ratings of ADHD Symptoms in First Grade Students

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Abstract

Teacher recognition of common behavioral or learning disorders is of paramount importance for the academic and personal success of children. Attention deficit hyperactivity disorder (ADHD), which affects 3-5% of school age children, is one such disorder that has serious educational consequences. The aim of this study was to elucidate the relation between teacher suspicion of ADHD and teacher ratings on common behavior measures used to identify and diagnose ADHD. The sample consists of urban, Midwestern, African-American first grade children (N=372). The children completed the Conners' Continuous Performance Test (CPT), and were also evaluated for ADHD symptomatology by both a teacher and primary caretaker. Teachers suspected 97 of the 372 children (26.1%) of ADHD. Results indicate that children suspected of ADHD by their teachers have significantly higher behavior ratings as measured by both teachers and primary caretakers, but not the Continuous Performance Test.

Comparison of Teacher Suspicion of ADHD to Teacher, Primary Caretaker, and Blinded Ratings of ADHD Symptoms in First Grade Students

The etiologic factors of attention-deficit hyperactivity disorder (ADHD) are currently poorly understood, however, are presumed to be associated with neurological dysfunction.[1] The symptoms associated with ADHD -- inattention, hyperactivity, and impulsivity -- have been estimated to be present in 3% to 5% of all school-age children.[2] A review of behavioral studies suggests that children with ADHD have more behavior problems, are less popular, are more self-destructive, and are more likely to have a co-diagnosis of conduct disorder.[1]

While clinicians are not required to seek reports from teachers to assess ADHD,[2] many do.[3] Often, teacher evaluations are given much credence. Moreover, teacher suspicions may result in the referral of the child for evaluation of learning disabilities and behavior disorders, including ADHD. Of critical importance then, is the ability of the classroom teacher to identify ADHD symptomatology.

Teacher recognition and referral of children for ADHD evaluation has practical implications. First, if teachers over-identify ADHD behavior, then they may refer children for evaluation at an excessive rate, using valuable limited resources unnecessarily. On the other hand, under-referral and missed diagnoses may have profound effects on adolescent behavioral outcomes including antisocial activities, cigarette and marijuana use, and negative academic outcomes.[4] Consequently, recognition of ADHD symptomatology and subsequent referral are important roles for the teaching profession. The purpose of this study, therefore, was to determine the relation among caretaker, teacher, and a computer generated stimulus-response measure of ADHD symptomatology, in a sample of first grade African-American children. The specific research questions to be addressed are as follows: 1) Do teachers that suspect a child of ADHD rate the

child's behavior as displaying more ADHD symptoms compared to those that they do not suspect of ADHD, and 2) what factors are most indicative of a teacher's suspicion of ADHD?

METHODS

Subjects:

A total of 372 urban, African American, first grade children (195 females, 177 males) were selected from a larger study investigating the effects of prenatal factors on first grade achievement and behavior. The cohort consisted of children born between January, 1989 and August, 1991 in an urban Midwestern metropolitan city.

Instruments:

Teacher suspicion of ADHD, teacher and parent reports of child behavior, and a computerized measure of attention were used to evaluate ADHD symptomatology. Teacher suspicion of ADHD was determined through an investigator designed School Age Assessment Survey. This report form was developed by the investigators to assess the teacher's knowledge or suspicion of various childhood illnesses and disorders, including ADHD. The survey asks teachers to respond "yes" or "no" to several questions regarding their knowledge or suspicion of a particular disorder in the child. The single item of "do you suspect that this child has ADHD" is imbedded in the assessment of other items, so as not to sensitize the teachers to the outcome in question. Twelve participants whose teachers answered in the affirmative to "have you ever been told that this child has ADHD" were excluded from this analysis.

Teacher and parent assessments of child behavior were obtained from two standardized measures. The Child Behavior Checklist (CBC),[5] a parent rating of child behavior, and the Teacher Report Form (TRF)[6] have been used in numerous studies. Each has displayed high test-retest reliability as well as internal consistency in previously published reports.[7] The CBC and

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TRF each consist of 113 questions which provide a standardized measure of behavior for children between the ages of 4 and 18. For each question, the adult indicates whether certain statements about the child are "not true", "somewhat true", or "very often true". Only subscales of clinical relevance were chosen to assess ADHD symptomatology. Those subscales included: the attention problems subscale of the TRF, and the hyperactivity and attention problems subscales of the CBC.

The Conners' Parent Rating Scales (CPRS) and the Conners' Teacher Rating Scales (CTRS)[8] are also widely used measures of child behavior. In these measures, the respondent rates the child's behavior by circling one of four responses: "not at all", "just a little", "pretty much", or "very much".

Parent subscales that were deemed relevant to this report include impulsive/hyperactive, and hyperactivity (CPRS). Three subscales were evaluated from the teacher ratings: hyperactivity, daydream/attention, and hyperactivity index (CTRS). Conners reports that correlations of the ratings by two parents ranged from .46 to .57, with a mean of .51. Inter-rater reliability on the teacher version (CTRS) ranged from .39 to .94 for the various subscales.

The Conners' Continuous Performance Test (CPT) is a computerized test that is an objective measure of attention. The respondent presses the space bar on a keyboard for any letter that appears on the computer screen, except X. The CPT records omission errors (not responding to targets), which suggests inattentiveness, and commission errors (responses to non-targets), which suggests impulsivity. The CPT takes approximately 12 minutes to administer. In a test by Halperin[9], the test-retest reliability of the CPT ranged from .50 to .74. Furthermore, Conners has shown that ADHD children consistently score most "problematic" when compared to other children in errors of omission and commission.[10]

Procedures:

Data collection was conducted between April, 1996 and June, 1998, following Institution Review Board (IRB) approval. After informed consent, data were collected from the primary caretaker during an office visit using the Child Behavior Checklist and Conners' Parent Rating Scales. At the same visit, the child was administered the Continuous Performance Test to measure attention and impulsivity. First grade teachers were contacted by mail, following informed consent of the primary caretaker, and asked to complete the CTRS, the TRF, and the School Age Assessment Survey on the child. Those teachers who did not respond within two months were contacted, and visits were made to the schools to collect the completed forms.

Data Analysis:

Raw scores for the selected subscales were converted to standardized T scores specific to each child's gender. A point biserial correlation was undertaken to examine the strength of association between the categorical variables, teacher and caretaker suspicion of ADHD (yes/no), and the continuous variables, the ADHD symptom subscales.

A multivariate analysis of variance (MANOVA) was performed to determine if the mean scores for each subscale differed (by group) by teacher suspicion subgroup. A stepwise discriminant analysis was performed to build a predictive model of group membership based on observed characteristics of each case. All teacher generated subscales, and teacher and child demographic variables were used to generate one discriminant function based on linear combinations of the predictor variables which provided the best discrimination between children thought to have ADHD and normal children.

Results:

Data were available for 372 children (195 female, 177 male). The mean age of the children

was 6.91 years, with a range of 5.66 to 7.74 years. The majority (84%) of the children were accompanied by a biological parent to the testing facility, 11.1% were brought in by a biological relative, and 4.9% were brought in by a non-biological relative.

Teachers identified themselves as having bachelors degrees (49.1%), masters degrees (50.6), or a PhD (0.3%). The average age of teachers who responded to the question (n=327, 87.6%) was 42.7 years (± 11.7). Teachers also identified their years of experience as a certified teacher (15.3 years ± 11.1) and years of experience in teaching first grade (8.2 years ± 8.1).

Teachers suspected ADHD for 97 children (26%), of which 65 (67.0%) were boys ($\chi^2 = 19.86$, $p < .01$). Teacher suspicion of ADHD was significantly ($p<.01$) related to all subscales of the teacher outcome measures, as shown in Table 1, as well as to the parent measures, as shown in Table 2. Teacher suspicion of ADHD, as shown in Table 3, was not significantly related to the CPT subscales.

TABLE 1
Correlations (r) of Teacher Indicated ADHD Behaviors with Teacher Suspicion of ADHD

	r	p
TRF		
Attention Problems	**0.54**	**<0.01**
CTRS		
Hyperactivity	**0.49**	**<0.01**
Daydream/Attention	**0.39**	**<0.01**
Hyperactivity Index	**0.49**	**<0.01**

TABLE 2
Correlations (r) of Parent Indicated ADHD Behaviors with Teacher Suspicion of ADHD

	r	p
CBC		
Attention Problems	**0.14**	**<0.01**
CPRS		
Impulsive/Hyperactive	**0.15**	**<0.01**
Hyperactivity	**0.16**	**<0.01**

TABLE 3
Correlations (r) of Computer Indicated ADHD Behaviors with Teacher Suspicion of ADHD

	r	p
CPT		
Lack of Impulse Control	**0.06**	**NS**
Loss of Attentiveness	**0.02**	**NS**

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A multivariate analysis of variance (MANOVA) was performed to determine whether teachers that suspect a child of ADHD rate the child's behavior as displaying ADHD symptoms (research question 1). The results of the MANOVA demonstrated a significant difference ($F = 1621.80$, $p < .01$) for between-groups scores of children suspected of ADHD compared to children who were not. Furthermore, children suspected of ADHD had significantly higher scores ($p < .05$) on all of the caretaker and teacher generated subscales. The Continuous Performance Test subscales of impulse control, and attentiveness did not differ by teacher suspicion of ADHD compared to normal children.

To determine what factors are most indicative of a teacher's suspicion of ADHD (research question 2), a discriminant analysis was conducted on the teacher related variables included in the study. The discriminant analysis yielded one discriminant function, which included the following variables: Daydream/attention (CTRS), hyperactivity index (CTRS), attention problems (TRF), and gender of the child (boy). Of those variables, attention problems (TRF) was the most influential, accounting for nearly twice as much weight (.81) as the hyperactivity index (.46), as shown in Table 4. The discriminant function correctly predicted the teacher suspicion classification of 80.4% of all cases, with a positive predictive value of 71/97 (74%) of the cases teachers suspected of ADHD, and a negative predictive value of 228/275 (82.9%) of those not suspected of ADHD.

TABLE 4
Results of Discriminant Function Analysis

	Discriminant Coefficients	**Structure Correlation**
Daydream/Attention (CTRS)	**-0.29**	**0.45**
Hyperactivity Index (CTRS)	**0.46**	**0.79**
Gender	**0.34**	**0.32**
Attention Problems	**0.81**	**0.82**

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DISCUSSION

Teachers are advantageously situated to evaluate children for ADHD behaviors, both because of the amount of contact with, and their naturalistic observations of the child. Given that advantage, it is common for pediatricians and psychologists to seek out teacher input in the diagnosis of ADHD. How well teachers recognize ADHD behaviors is an important question therefore, given the seriousness of the ramifications of true and untrue diagnoses. The results of this study indicate that teacher suspicion of ADHD was indeed related to an increase in reported ADHD symptomatology, by both the caretaker and the teacher. This implies that teachers are aware of the symptoms associated with ADHD and can therefore be considered a reliable and valid source of information for the diagnosing clinician, as well as an effective screening mechanism for referring children of the suspected condition.

The fact that teacher and caretaker ratings of the child's behavior were positively related also lends validity to the teacher's observations. Furthermore, the discriminant function identified three hyperactivity subscales and the gender of the child (boy), as being predictive of the teacher's suspicion of ADHD in 80% of all cases. The fact that gender was a significant contributor to the prediction model is consistent with previous reports of the prevalence of ADHD in boys. Typically, prevalence ratios have ranged from 4:1 to 9:1 for boys to girls.[2] However, a caveat to the teachers' credibility is that the Continuous Performance Test, which generated fine only unbiased ratings of the children's behavior, did not tend to support the teacher or caretaker ratings of attention problems or impulsivity.

This study is limited in that the participants in this study were not randomly selected. Thus, no attempt should be made at comparing the established epidemiologic assumptions of ADHD in the school-age population (3% to 5%)[2] to that of the rate of the teacher's suspicion of ADHD

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within this sample (26.1%). Furthermore, considerable caution has been exercised in this report to not diagnose the children as ADHD based on the caretaker, teacher, or unbiased computer ratings, which may be considered a limitation to the study. Therefore, two recommendations for future research would be to (1) determine how accurate teachers are in suspecting ADHD in children who are clinically diagnosed with the disorder, and (2) to determine the relation between teacher suspicion of ADHD, referral for testing, and subsequent diagnosis.

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